

Estimation of Regional Groundwater Budgets in Nova Scotia Using a Desktop GIS Approach

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In April 2007, the Province of Nova Scotia passed the *Environmental Goals and Sustainable Prosperity Act*. One of the targets set out in the act is the development of a comprehensive water resource management strategy by 2010, which will help the government make decisions about Nova Scotia's water resources. Planning for the strategy highlighted the need to develop preliminary regional groundwater budgets to prioritize groundwater assessment activities and to answer fundamental questions about groundwater use and availability.

Regional groundwater budgets were estimated for 44 major groundwatersheds across Nova Scotia. Groundwatershed boundaries assumed to correspond to primary surface watershed boundaries, since groundwater flow boundaries are not well defined in the province.

Groundwater availability was estimated using a GIS processing model with precipitation and bedrock groundwater recharge ratio inputs derived from available climate and streamflow data. Municipal wells and residential and non-residential unserviced groundwater users were plotted, and total groundwater use in each major groundwatershed was estimated using the best available information. Few flow records could be obtained, and therefore groundwater use estimates often relied on typical water use figures for a given user type. Although the budgets have a high level of uncertainty, groundwater usage appears to be sustainable on a regional scale with groundwater use ranging from 0.1 to 12.5% of available groundwater. Groundwater budgets of selected subwatershed areas are presented for comparison, and emerging issues with respect to groundwater sustainability are highlighted.

The spatial database developed during this study will permit the integration of new and more refined data and a continuing evaluation of groundwater budgets. The study recommends that the sustainability of Nova Scotia's bedrock aquifers should be assessed as part of local or watershed scale groundwater assessment activities. More detailed work, including the installation of long-term observation wells and groundwater use surveys, should follow in watersheds that were found to have higher groundwater use compared to availability.